CLAIMS

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1. A process for producing an optically active 2-alkyl-L-cystein or a salt thereof from a 2-alkylcysteinamide or a salt thereof, which comprises allowing cells of microorganism or a treated product thereof having an activity of stereoselective hydrolysis of the amide bond of a 2-alkyl-L-cysteinamide or a salt thereof to act on a 2-alkylcysteinamide represented by the general formula (1) or a salt thereof, so as to generate a 2-alkyl-L-cysteine represented by the general formula (2) or a salt thereof;

allowing the generated 2-alkyl-L-cysteine or salt thereof and an unreacted 2-alkyl-D-cysteinamide represented by the general formula (3) or a salt thereof to react with an aldehyde or ketone represented by the general formula (4), or an acetal or ketal thereof, so as to derive therefrom a 4-alkylthiazolidine-4-carboxylic acid represented by the general formula (5) or a salt thereof and a 4-alkylthiazolidine-4-carboxamide represented by the general formula (6) or a salt thereof, respectively;

separating the 4-alkylthiazolidine-4-carboxylic acid represented by the general formula (5) or salt thereof from the mixture thereof; and

25 hydrolyzing it for ring-opening to yield an optically active 2-alkyl-L-cysteine represented by the general formula (2) or a salt thereof,

$$\begin{array}{c|c} R \\ NH_2 \\ \hline \\ CONH_2 \\ \hline \\ (1) \\ \end{array} \begin{array}{c|c} Stereoselective \\ hydrolysis \\ \hline \\ (1) \\ \end{array} \begin{array}{c|c} R \\ \hline \\ COOH \\ HS \\ \end{array} \begin{array}{c|c} R \\ \hline \\ COOH \\ HS \\ \end{array} \begin{array}{c|c} R_1 \\ \hline \\ (4) \\ \hline \\ (4) \\ \hline \\ (3) \\ \end{array}$$

where in the general formulas (1), (2), (3), (5) and (6), R represents a C₁₋₄ lower alkyl; and in the general formulas (4), (5) and (6), each of R₁ and R₂ independently represents hydrogen or a C₁₋₄ lower alkyl, or R₁ and R₂ bind to each other to form a 5- to 8-membered alicyclic structure, provided that R₁ and R₂ do not simultaneously represent hydrogen.

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2. A process for producing an optically active 2-alkyl-D-cystein or a salt thereof from a 2-alkylcysteinamide or a salt thereof, which comprises

allowing cells of microorganism or a treated product

thereof having an activity of stereoselective hydrolysis

of the amide bond of a 2-alkyl-L-cysteinamide or a salt

thereof to act on a 2-alkylcysteinamide represented by

the general formula (1) or a salt thereof, so as to

generate a 2-alkyl-L-cysteine represented by the general
formula (2) or a salt thereof;

allowing the generated 2-alkyl-L-cysteine or salt thereof and an unreacted 2-alkyl-D-cysteinamide represented by the general formula (3) or a salt thereof to react with an aldehyde or ketone represented by the general formula (4), or an acetal or ketal thereof, so as to derive therefrom a 4-alkylthiazolidine-4-carboxylic acid represented by the general formula (5) or a salt thereof and a 4-alkylthiazolidine-4-carboxamide represented by the general formula (6) or a salt thereof, respectively;

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separating the 4-alkylthiazolidine-4-carboxamide represented by the general formula (6) or salt thereof from the mixture thereof; and

hydrolyzing it for ring-opening and amide hydrolysis to yield an optically active 2-alkyl-D-cysteine represented by the general formula (7) or a salt thereof,

HS
$$\frac{R}{CONH_2}$$
 $\frac{Stereoselective}{hydrolysis}$ $\frac{R}{HS}$ $\frac{R}{COOH}$ $\frac{R}{HS}$ $\frac{R}{COOH}$ $\frac{R}{HS}$ $\frac{R}{CONH_2}$ $\frac{R_1}{R_2}$ $\frac{R_2}{(4)}$

$$\begin{bmatrix} R & R & R \\ S & NH & S & NH \\ R_1 & R_2 & R_1 & R_2 \\ (5) & (6) & (6) & (6) & (7) \end{bmatrix}$$

$$\begin{bmatrix} R & R & R & R \\ R_1 & R_2 & R_1 & R_2 \\ R_2 & R_2 & R_2 \\ R_3 & R_2 & R_3 \\ R_4 & R_2 & R_3 \\ R_4 & R_2 & R_3 \\ R_5 & R_2 & R_3 \\ R_5 & R_3 & R_3 \\ R_5 & R_5 & R_5 \\$$

where in the general formulas (1), (2), (3), (5), (6) and (7), R represents a C_{1-4} lower alkyl; and in the general formulas (4), (5) and (6), each of R_1 and R_2

- independently represents hydrogen or a C_{1-4} lower alkyl, or R_1 and R_2 bind to each other to form a 5- to 8-membered alicyclic structure, provided that R_1 and R_2 do not simultaneously represent hydrogen.
- 10 3. A process for producing a 4-alkylthiazolidine-4carboxylic acid or a salt thereof, or an optically active 4-alkylthiazolidine-4-carboxylic acid or a salt thereof, which comprises

allowing a 2-alkylcysteine represented by the

general formula (10) or a salt thereof, an optically
active 2-alkyl-L-cysteine represented by the general
formula (2) or a salt thereof, or an optically active 2alkyl-D-cysteine represented by the general formula (7)
or a salt thereof to react with an aldehyde or ketone

represented by the general formula (4), or an acetal or
ketal thereof, so as to derive therefrom a 4alkylthiazolidine-4-carboxylic acid represented by the
general formula (8) or a salt thereof, or an optically
active 4-alkylthiazolidine-4-carboxylic acid represented
by the general formula (5) or (9) or a salt thereof,

where in the general formulas (2), (5), (7), (8), (9) and (10), R represents a C₁₋₄ lower alkyl; and in the general formulas (4), (5), (8) and (9), each of R₁ and R₂

5 independently represents hydrogen or a C₁₋₄ lower alkyl, or R₁ and R₂ bind to each other to form a 5- to 8-membered alicyclic structure, provided that R₁ and R₂ do not simultaneously represent hydrogen.

10 4. The process according to claim 1 or 2, wherein the microorganism having an activity of stereoselective hydrolysis of the amide bond of a 2-alkyl-L-cysteinamide or a salt thereof is a bacterium which belongs the genus Xanthobacter, the genus Protaminobacter, or the genus Mycoplana.

- 5. The process according to any of claims 1 to 3,5 wherein said R represents methyl.
 - 6. The process according to any of claims 1 to 3, wherein said R_1 and R_2 both represent methyl.
- 7. The process according to any of claims 1 to 3, wherein a basic catalyst is used when the 2-alky1-L-cysteine represented by the general formula (2) or salt thereof, the 2-alky1-D-cysteinamide represented by the general formula (3) or salt thereof, the 2-alky1-D-cysteine represented by the general formula (7) or salt thereof, or the 2-alky1cysteine represented by the general formula (10) or a salt thereof is allowed to react with the aldehyde or ketone represented by the general formula (4), or an acetal or ketal thereof.

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8. The process according to any of claims 1 to 3, wherein a dehydrating agent is used when the 2-alkyl-L-cysteine represented by the general formula (2) or salt thereof, the 2-alkyl-D-cysteinamide represented by the general formula (3) or a salt thereof, the 2-alkyl-D-cysteine represented by the general formula (7) or salt thereof, or the 2-alkylcysteine represented by the

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general formula (10) or salt thereof, is allowed to react with the aldehyde or ketone represented by the general formula (4), or an acetal or ketal thereof.

5 9. A 4-alkylthiazolidine-4-carboxylic acid represented by the general formula (8) or a salt thereof:

$$R$$
 $COOH$
 S
 NH
 R_1
 R_2
 R_2

where in the general formula (8), R represents a C_{1-4} lower alkyl; and each of R_1 and R_2 independently

represents hydrogen or a C_{1-4} lower alkyl, or R_1 and R_2 bind to each other to form a 5- to 8-membered alicyclic structure, provided that R_1 and R_2 do not simultaneously represent hydrogen.

15 10. An optically active 4-alkylthiazolidine-4-carboxylic acid represented by the general formula (5) or (9) or a salt thereof:

$$R_1$$
 R_2 R_2 R_3 R_4 R_5 R_5 R_5 R_6 R_6 R_7 R_8

$$R$$
 NH
 R_1
 R_2
 R_2
 R_3
 R_4
 R_2

where in the general formulas (5) and (9), R represents a C_{1-4} lower alkyl; and each of R_1 and R_2 independently represents hydrogen or a C_{1-4} lower alkyl, or R_1 and R_2 bind to each other to form a 5- to 8-membered alicyclic structure, provided that R_1 and R_2 do not simultaneously represent hydrogen.

11. The compound according to claim 9 or 10, wherein said R represents methyl.

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12. The compound according to claim 9 or 10, wherein said R_1 and R_2 both represent methyl.